REMARKS

Claims 1, 13, 21 and 24, have been amended to overcome the Examiner's 112 rejection raised in the last Action, and also to clarify the claims. Support for these amendments can be found in paragraph 59 of the specification. Claims 7, 14 and 26 also have been amended to clarify the invention. Claims 8, 15, 25 and 27 have been amended for consistency. And, claim 3 has been amended to correct minor typographical errors. No new matter has been entered by any of the foregoing amendments.

Turning to the rejection of claims 1-34 under 35 USC § 112, these claims have been amended to specify that the trapped exception is translated into a C++ exception. In addition, claim 14 has been amended to clarify the ambiguity between claims 13 and 14. Thus, it is believed all of the Examiner's 112 rejection has been overcome.

Turning to the Examiner's rejection of claims 1, 3-4, 7, 13-14, 21, 23-24, 26 and 33-34 under 35 USC § 103 as obvious over Kannan et al. (U.S. Patent 5,815,702, hereinafter called "Kannan") in view of Bak et al. (U.S. Patent 6,415,381, hereinafter called "Bak"), Applicants respectfully request reconsideration of the rejection based upon the amended claims as set forth below.

Claim 1

Kannan discloses a software product for continued application execution after generation of fatal exceptions by using a safe message loop 109 which is "a portion of code that replaces, or substitutes for this main event or message loop of any application 105 once the application generates a fatal exception" (column 4, lines 58-61). As shown in Figure 3, when the current instruction 302 of the application 105 generates 301 a fatal exception, the operating system 111 halts the execution of the application's instructions and sends fault data to the

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exception handler 115. If the user chooses to continue 311, the exception handler 115 replaces 315 the address of the instruction register 121 with the location of the entry address of the safe message loop 109. The OS 111 uses this new values of the address and resumes its execution at the safe message loop 109. The thread of control 316 is within the safe message loop 109 (column 7, lines 49-62).

Kannan's safe message loop 109 is loaded into the memory 103 in advance (column 6, lines 36-37). Thus, replacing the existing message loop with the safe message loop 109 may not always work where the user wants the application to continue to run as if nothing happened. There may be some logic around the existing message loop that, if replaced with the safe message loop 109, may lead to undesired behaviour of the application.

The Examiner has acknowledged that Kannan does not disclose or suggest translation of the exception into an exception that the application is capable of handling; however, the Examiner has cited Bak to supply this missing teaching.

Bak discloses implementation of an execution stack that stores frames for functions written in multiple programming languages (column 2, lines 50-52). Bak describes handling of exceptions in the execution stack. When an exception is generated, a search for an exception handler for that exception starts within the function in which the exception was thrown and then propagates through the functions on the execution stack, and if an exception handler is found, the exception handler catches the exception and takes the appropriate action (column 11, lines 25-32).

As the Examiner has noted, Bak describes transformation of the C++ exception to a Java exception (column 11, lines 50-55). However, Bak transforms exceptions in the context of representing the execution stack by a complier. Since the execution stack stores frames for

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functions written in multiple languages, the compiler has to deal with the multiple languages, and thus, Bak transforms the exception in order to propagate it to a function in a different language. This is different from translation of a trapped exception as required by claim 1 of the present application. Amended claim 1 requires translation of a trapped exception into a C++ exception that the C++ based application is capable of handling, thus the execution of the application can be continued. In contrast, Bak does not disclose such trapping of an exception or translation of a trapped exception.

As Bak is directed to exception handling in an execution stack, there is no motivation to combine this reference with Kannan which does not disclose any execution stack. Accordingly, Applicant respectfully submits that the teaching of Bak cannot be combined with the treating of Kannan. Furthermore, even if one skilled in the art were to combine Bak with Kannan, he would still replace an existing message loop of an application with a pre-stored safe message loop according to the teaching of Kannan, and fail to translate a trapped exception into a C++ exception. As there is no execution stack in Kannan, he would not use transformation taught by Bak.

Therefore, Applicants respectfully submit that the invention as recited in amended claim 1 has patentably distinguished over Kannan and Bak.

Claims 3, 4 and 7 are directly dependent on claim 1, and are allowable over Kannan et al. and Bak et al. for the same reasons above adduced relative to claim 1, as well as for their own additional limitations, and the following:

Claim 3

The Examiner has stated that Kannan teaches determining a corresponding exception handler to which the exception is to be dispatched.

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Kannan's system sends information identifying the exception and system status information to the chain 114 of exception handlers. Figure 1 shows arrows from application exception handlers 113 to crashguard exception handler 115 and to operating system exception handlers 117. However, Kannan does not appear to disclose determining a corresponding exception handler.

Claim 3 depends on claim 1, and accordingly, Kannan does not anticipate claim 3 or render claim 3 obvious. Accordingly, it is respectfully submitted that claim 3 is patentably distinguished over Kannan and Bak.

Claim 4

The Examiner has stated that Kannan teaches the dispatching the trapped exception to a trapped exception handler.

Claim 4 depends on claim 1 and accordingly, it is respectfully submitted that claim 4 is patentably distinguished over the cited references.

Claim 7

The Examiner has indicated that Kannan does not teach the translating step, but Bak teaches the translating step.

As discussed above, Bak teaches transformation of exceptions for propagation over an execution stack. However, Bak does not teach translation of a trapped exception as recited in claims 1 and 7.

Accordingly, it is respectfully submitted that claim 7 is also patentably distinguished over the cited references.

Claim 13

The Examiner has rejected claim 13 referring to the rejection of claim 1.

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Claim 13 has been amended in the similar manner to the amendments made in claim 1. Accordingly, as discussed above, it is respectfully submitted that claim 13 has also patentably distinguished over the cited references, for the same reasons discussed above.

Claim 14

Claim 14 is dependent on claim 13 and is allowable for the same reasons above adduced relative to claim 13, as well as for its own additional limitations.

The Examiner has rejected claim 14 referring to the rejection of claim 7.

Claim 14 has been amended in the similar manner to the amendments made in claim 7. Accordingly, as discussed above, Applicants trust that claim 14 is also patentable over the cited references for the reasons set out above.

Claim 21

The Examiner has rejected claim 21 referring to claim 1.

Claim 21 has been amended in the similar manner to the amendments made in claim 1. Accordingly, as discussed above, Applicants trust that claim 21 is also patentable over the cited references for the reasons set out above.

Claim 23

Claims 23 and 24 are dependent on claim 21, and are allowable for the same reasons above adduced for claim 21, as well as for their own additional limitations.

The Examiner has stated that Kannan teaches the exception trapper is provided in place of a top level exception handler.

As the Examiner has indicated, the exception handler 115 is inserted in the exception handler chain 114 ahead of operating system provided exception handlers, but it is not provided

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in place of a top level exception handler. Accordingly, Applicants trust that claim 23 has patentably distinguished over the cited references.

Claim 24

The Examiner has indicated that it would have been obvious to combine the teaching of Kannan and Bak to improve the performance of the system of Kannan by being able to handle the exception in multiple programming languages.

As discussed above in connection with claim 1, neither Kannan nor Bak disclose an exception translator as recited in claim 24. Bak's transformation of exceptions is carried out to propagate exceptions over an execution stack. Thus, it is not possible to combine Bak's transformation of exceptions into Kannan's system because there is no execution stack disclosed in Kannan. Even if one attempts to combine them, he would not improve the performance of Kannan's system, as he would still replace the loops as taught by Kannan to handle fatal exceptions. As Kannan does not disclose an execution stack, Bak's teaching cannot be incorporated in Kannan's system.

Accordingly, it is respectfully submitted that claim 24 has also patentably distinguished over Kannan and Bak.

Claim 26

Claim 26 is dependent on claim 24, and is allowable for the same reasons above adduced relative to claim 24, as well as for its own additional limitations.

The Examiner has rejected claim 26 referring to claim 3.

Claim 26 has been amended in a similar manner to the amendments made in claim 3. Accordingly, as discussed above, Applicants trust that claim 26 is also patentable over the cited references for the reasons set out above.

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Claims 33 and 34

These claims have been amended in a similar manner to the amendments made in claim 1, and are allowable over the cited references, for the same reasons discussed above.

35 U.S.C. 103(a) Rejection of Claims 2, 5-6, 8, 15-16, 22, 25 and 27-28

The Examiner has rejected claims 2, 5-6, 8, 15-16, 22, 25 and 27-28 under 35 U.S.C. 103(a), stating that these claims are unpatentable over Kannan in view of Bak further in view of Anschuetz et al (US Patent 5,305,455, hereinafter called "Anschuetz"). Applicants respectfully request reconsideration of this rejection for the reasons set out below.

The deficiencies of the combination of Kannan and Bak are discussed above. It is not seen that Anschuetz supplies the missing teachings to Kannan and Bak to achieve or render obvious any of the independent claims 1, 13, 21 and 24 or claims 2, 5, 6, 15-16, 22, 25 and 27-28 which depend thereon.

Claim 2

The Examiner acknowledges that Kannan does not teach terminating the thread that caused the exception. However, the Examiner has indicated that Anschuetz teaches terminating the thread that caused the exception, and that it would have been obvious to combine the teaching of Kannan and Anschuetz.

Anschuetz deals only with handing an operating system level exception. Anschuetz receives an exception of an operation system, and dispatches the exception in the operation system to an exception handler. The thread referred to in column 5, lines 9-16 is one executing a process in the operation system. Claim 2 depends on claim 1 and accordingly, the thread recited in claim 2 is one executing the application. Anschuetz does not teach termination of a thread executing the application.

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Further, as discussed above, Kannan does not disclose translation of the trapped exception. Accordingly, it is respectfully submitted that claim 2 is patentably distinguished over the cited references.

Claim 5

The Examiner acknowledges that Kannan does not teach terminating the thread when the trapped exception handler is not capable of resolving the trapped exception, that Anschuetz teaches a step of terminating the thread when the trapped exception handler is not capable of resolving the trapped exception, and that it would have been obvious to combine the teaching of Kannan and Anschuetz.

Claim 5 depends on claim 4, which in turn depends on claim 1. Accordingly, as described above, Anschuetz does not teach the terminating step as recited in claim 5 which relates to an exception caused due to a runtime fault in a thread executing the application.

Further, as discussed above, Kannan does not disclose translation of the trapped exception. Accordingly, it is respectfully submitted that claim 5 is patentably distinguished over the cited references.

Claim 6

The Examiner acknowledges that Kannan does not teach the continuing step allows continuing execution of the application after the thread is terminated, that Anschuetz teaches terminating the thread that caused the exception, and that it would have been obvious to combine the teaching of Kannan and Anschuetz.

Claim 6 depends on claim 5, which indirectly depends on claim 1. As discussed above, claim 1 is patentably distinguished over Kannan. Accordingly, it is respectfully submitted that claim 6 is also patentably distinguished over the cited references.

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Claim 8

The Examiner acknowledges that Kannan does not teach terminating the thread that caused the exception when there is no lower level exception which is capable of resolving the translated exception and teaches the application is terminated when there is no lower level exception which is capable of resolving the exception, that Anschuetz teaches terminating the thread that caused the exception, and that it would have been obvious to combine the teaching of Kannan and Anschuetz.

Claim 8 depends on claim 7, which in turn depends on claim 1. As discussed above, claims 1 and 7 are patentably distinguished over Kannan in view of Bak and Anschuetz. Accordingly, it is respectfully submitted that claim 8 is also patentably distinguished over the cited references.

Claims 15, 16, 22, 25 and 27

The Examiner has rejected claim 15, 16, 22, 25 and 27 referring to the rejections of claims 8 and 2.

The deficiencies of the combination of Kannan, Bak and Anschuetz vis-à-vis claims 2 and 8 are discussed above. Claims 15, 16, 22, 25 and 27 are similarly allowable over the applied art.

The Examiner has indicated that Kannan does not teach terminating the thread that caused the exception when there is no lower level exception which is capable of resolving the translated exception and teaches the application is terminated when there is no lower level exception which is capable of resolving the exception, that Anschuetz teaches terminating the thread that caused the exception, and that it would have been obvious to combine the teaching of Kannan Anschuetz.

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Claim 8 depends on claim 7, which in turn depends of claim 1. As discussed above, claims 1 and 7 are patentably distinguished over Kannan and the secondary references. Accordingly, it is respectfully submitted that claim 8 is also patentably distinguished over the cited references.

Claim 28

The Examiner has stated that Kannan teaches the trapped exception handler further comprises a state restorer for restoring the state that the application was in before the fault occurred to continue the execution of the application.

Claim 28 depends on claim 27, which indirectly depends on claim 24. The deficiencies of the applied art vis-à-vis claim 24 are discussed above. Claim 28 is allowable for the same reasons above adduced relative to claim 24 as well as for its own additional limitations.

35 U.S.C. 103(a) Rejection of Claims 9-12, 17-20 and 29

The Examiner has rejected claims 9-12, 17-20 and 29 under 35 U.S.C. 103(a), stating that these claims are unpatentable over Kannan in view of Bak further in view of Anschuetz further in view of LeVine et al (US Patent 6,591,379 B1, hereinafter called "LeVine"). Applicants respectfully request reconsideration of this rejection for the reasons set out below.

Applicant respectfully submits that the need of combining four references evidences that these claims are unobvious.

Claims 9-12 are directly or indirectly dependent on claim 1; claims 17-20 on claim 13, and claim 29 on claim 24. The deficiencies of the combination of Kannan, Bak and Anschuetz vis-à-vis claims 1, 13 and 24 are discussed above. LeVine does not supply the missing teachings.

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Claim 9

The Examiner acknowledges that Kannan does not teach logging state information representing the state that the application was in before occurrence of the exception. However, he indicated that LeVine teaches logging of such state information.

LeVine deals with injecting an exception into a hung program, rather than receiving an exception and dealing with it in a way to preserve the state of the running application. Accordingly, it is respectfully submitted that one skilled in the art would not combine the teaching of LeVine with Kannan and Anschuetz. Even if he combines, he would still fail to translate a received exception occurred in an application into an exception that can be handled by the application, as recited in claim 1.

Claim 9 depends on claim 2 which in turn depends on claim 1. Therefore, Applicants trust that claim 9 is patentable over these references.

Claim 10

The Examiner acknowledges that Kannan does not teach forwarding the logged information to a remote database over a computer network, but that LeVine teaches a step of forwarding the logged information to a remote database.

Claim 10 depends indirectly on claim 1. Therefore, Applicants trust that claim 10 is patentable over these references as discussed above.

Claim 11

The Examiner acknowledges that Kannan teaches the steps of receiving a recommendation and informing it to the user.

Claim 11 depends indirectly on claim 1. Therefore, Applicants trust that claim 11 is patentable over these references as discussed above.

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Claim 12

The Examiner acknowledges that Kannan does not teach forwarding a bug report to a bug report center over a computer network, but that LeVine teaches the step of forwarding a bug report to a bug report centre.

Claim 12 depends indirectly on claim 1. Therefore, Applicants trust that claim 12 is patentable over these references as discussed above.

Claims 17-20 and 29

The Examiner has rejected claims 17-20 and 29 referring to the rejections of claims 9-12 and 9, respectively.

As discussed above, claims 9-12 are patentably distinguished over Kannan and LeVine and other references. Accordingly, Applicants trust that these claims are also patentable over the cited references for the reasons set out above.

35 U.S.C. 103(a) Rejection of Claims 30-32

The Examiner has rejected claims 30-32 under 35 U.S.C. 103(a), stating that these claims are unpatentable over Kannan in view of Bak further in view of Anschuetz further in view of LeVine further in view of Lillevold (US Patent 6,230,284 B1, hereinafter called "Lillevold"). Applicants respectfully request reconsideration of this rejection for the reasons set out below.

Applicant respectfully submits that the need to combine five references to make out a case for obviousness show just how unobvious the claims are!

Claim 30

The Examiner acknowledges that Kannan does not teach a query generator for generating a query including the state information to query a recommendation from a remote

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database over a computer network. However, the Examiner has indicated that Lillevold teaches the crash handler program determines the state of the computer, sends the information to the server, and the server sends revision code to the computer, and that it would be obvious to combine the teaching of Lillevold with the other four references Kannan, Bak, Anschuetz and LeVine.

Lillevold uses interrupts to catch program error, which may only be appropriate for legacy MSDOS and old Windows programs. This is different from the application recovery system as recited in claim 30. Claim 30 depends on claim 29 which in turn depends on claim 24. The application recovery system as recited in claim 30 has the exception trapper, exception translator and trapped exception handler as recited in claim 24 as well as the query generator recited in claim 20.

Thus claim 30 cannot be said to be obvious from the art.

Claims 31 and 32

The Examiner has rejected claims 31 and 32 referring to the rejections of claims 11 and 12, respectively.

As discussed above, claims 11 and 12 have patentably distinguished over Kannan and Lillevold and other references. Accordingly, Applicants trust that these claims are also patentable over the cited references for the reasons set out above as well as for their own additional limitations.

Consequently, it is respectfully submitted that all claims currently on file are patentable over the cited references. Reconsideration of the application is respectfully requested.

Having dealt with all the objections raised by the Examiner, the Application is believed to be in order for allowance. Early and favorable action are respectfully requested.

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In the event there are any fee deficiencies or additional fees are payable, please charge them (or credit any overpayment) to our Deposit Account Number 08-1391.

Respectfully submitted,

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